

Claims

[c1] What is claimed is:

1.A semiconductor acceleration sensor comprising:
a non-single-crystal-silicon-based substrate;
an insulating beam structure having a movable section
and a stationary section;
at least one piezoresistor positioned on the beam structure;
an insulating supporter positioned on the non-single-crystal-silicon-based substrate for fixing the stationary section of the beam structure and forming a distance between the beam structure and the non-single-crystal-silicon-based substrate; and
a thin film transistor (TFT) control circuit positioned on the non-single-crystal-silicon-based substrate and electrically connected to the piezoresistor and the beam structure.

[c2] 2.The semiconductor acceleration sensor of claim 1
wherein the non-single-crystal-silicon-based substrate
is a glass substrate.

[c3] 3.The semiconductor acceleration sensor of claim
2wherein the TFT control circuit is a low temperature

polysilicon TFT control circuit.

- [c4] 4.The semiconductor acceleration sensor of claim 1 wherein the non-single-crystal-silicon-based substrate is a quartz substrate.
- [c5] 5.The semiconductor acceleration sensor of claim 4 wherein the TFT control circuit is a high temperature polysilicon TFT control circuit.
- [c6] 6.The semiconductor acceleration sensor of claim 1 wherein the beam structure and the supporter are formed simultaneously.
- [c7] 7.The semiconductor acceleration sensor of claim 6 wherein the beam structure and the supporter both comprise silicon dioxide.
- [c8] 8.The semiconductor acceleration sensor of claim 1 wherein the piezoresistor comprises doped polysilicon.
- [c9] 9.The semiconductor acceleration sensor of claim 1 wherein the piezoresistor comprises a piezoelectric thin film.
- [c10] 10.The semiconductor acceleration sensor of claim 9 wherein the piezoelectric thin film comprises ZnO, Ba-TiO₃, or PbZrTiO₃ (PZT).

- [c11] 11.The semiconductor acceleration sensor of claim 1 wherein the non-single-crystal-silicon-based substrate further comprises a thin film transistor display region for displaying a variation of pressure detected by the semiconductor acceleration sensor.
- [c12] 12.A semiconductor acceleration sensor comprising:
an insulating substrate;
an insulating cantilever beam structure positioned on the insulating substrate having a movable section, the movable section and the insulating substrate being separated by a distance;
at least one piezoresistor positioned on the cantilever beam structure; and
a control circuit electrically connected to the piezoresistor and the cantilever beam structure.
- [c13] 13.The semiconductor acceleration sensor of claim 12 wherein the cantilever beam structure comprises silicon dioxide.
- [c14] 14.The semiconductor acceleration sensor of claim 12 wherein the piezoresistor comprises doped polysilicon.
- [c15] 15.The semiconductor acceleration sensor of claim 12 wherein the piezoresistor comprises a piezoelectric

thin film.

- [c16] 16.The semiconductor acceleration sensor of claim 12wherein the piezoelectric thin film comprises ZnO, Ba-TiO₃,or PbZrTiO₃ (PZT).
- [c17] 17.The semiconductor acceleration sensor of claim 12wherein the insulating substrate is a glass substrate.
- [c18] 18.The semiconductor acceleration sensor of claim 17wherein the control circuit is positioned on the glass substrate and the control circuit comprises a low temperature polysilicon thin film transistor control circuit.
- [c19] 19.The semiconductor acceleration sensor of claim 18wherein the insulating substrate is a quartz substrate.
- [c20] 20.The semiconductor acceleration sensor of claim 19wherein the control circuit is positioned on the quartz substrate and the control circuit comprises a high temperature polysilicon thin film transistor control circuit.
- [c21] 21.The semiconductor acceleration sensor of claim 12wherein the control circuit is positioned on a printed circuit board (PCB) electrically connected to the cantilever beam structure and the piezoresistor via a flexible printed circuit (FPC) board.
- [c22] 22.The semiconductor acceleration sensor of claim

12wherein the control circuit is positioned on a flexible printed circuit (FPC) board, the control circuit being electrically connected to the cantilever beam structure and the piezoresistor via the flexible printed circuit board.

[c23] 23.The semiconductor acceleration sensor of claim 12wherein the insulating substrate further comprises a thin film transistor display region for displaying a variation of pressure detected by the semiconductor acceleration sensor.